LYCODES ADOLFI, A NEW SPECIES OF EELPOUT (ZOARCIDAE) FROM GREENLAND

by

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ABSTRACT. - *Lycodes adolfi* is described on the basis of eleven specimens caught off Northwest and Northeast Greenland. It differs from all other Atlantic *Lycodes* spp. in the restricted squamation which begins at the midpoint of the fish or further back. It seems most similar to *L. atlanticus* Jensen, 1902.

RÉSUMÉ. - Une espèce nouvelle de Zoarcidae, *Lycodes adolfi*, est décrite du nord-est et du nord-ouest Groenland à partir de 11 spécimens. Cette espèce diffère des autres *Lycodes* atlantiques par son écaillure qui ne commence qu'au milieu du poisson ou même plus en arrière. C'est à *L. atlanticus* Jensen, 1902 que *L. adolfi* ressemble le plus.

Key-words.- Zoarcidae, *Lycodes adolfi*, Arctic, Greenland, New species.

In connection with the preparation of a field guide to the fishes of Greenland we found among the abundant *Lycodes*-material many specimens which proved difficult to identify. Some of these are so small that not all of the specific characters are developed yet, such as squamation and lateral line(s). Other specimens seem to belong to species in which the ontogenetic changes in i. a. colour-pattern is not sufficiently well known, for instance in *L. luetkeni*, *rossi* and *polaris*. Finally there are eleven specimens which belong to an as yet undescribed species. This new zoarcid is referred to the genus *Lycodes* Reinhardt, 1831 on the basis of its well developed mental crests (= a broad sheath of cartilage on the ventral side of each dentary) and no distinct head pores. We should here add that we have kept in mind what Lütken (1898) wrote in the introduction to the genus *Lycodes*: "The scientific literature amply testifies, that it is a more easy matter to make mistakes in this department than to avoid them".

LYCODES ADOLFI N. SP.

(Figs 1, 2)

Material examined

Holotype. - ZMUC P761186 (SL 215 mm),"Shinkai Maru" haul 53 (68°49'N,19°44'W), 1371-1380 m, bottom trawl, temp. -0.2°C, 25 Sept. 1989.

Paratypes. - ZMUC P761187-1190 (SL 80-218 mm), same data as for holotype. - ZMUC P761191 (SL 200 mm), "Shinkai Maru" haul 54 (68°52'N, 19°14'W), 1310-1325 m, bottom trawl, temp. -0.4°C, 25 Sept. 1989. - ZMUC P761192 (SL 230 mm), "Shinkai Maru" haul 56 (71°04'N, 18°54'W), 1283-1294 m, bottom trawl, temp. -0.2°C, 28 Sept. 1989.

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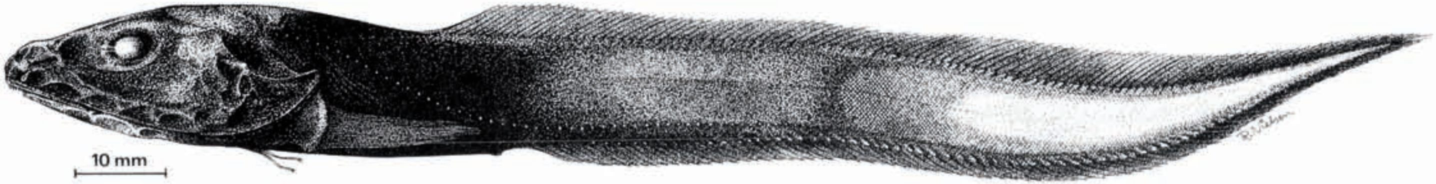

Fig. 1. - Holotype of *Lycodes adolfi,* SL 215 mm. ZMUC P761186.

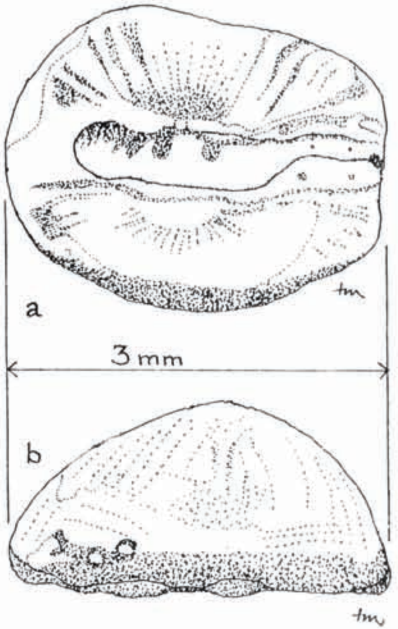

Fig. 2. - Left sagitta (length 3 mm) from paratype of *L. adolfi,* SL 210 mm. a: median view; b: dorsal view. ZMUC P761187.

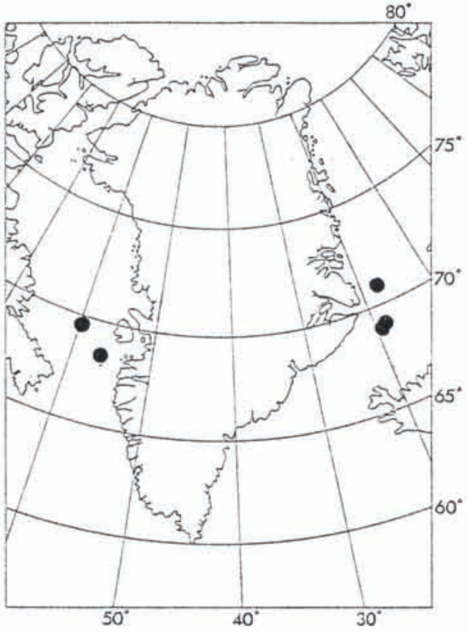

Fig. 3. - Records of *L. adolfi.*

Additional material. - ZMUC P761193 (SL 208 mm), "Shinkai Maru" haul 20 (68°23'N, 56°06'W), 527-536 m, bottom trawl, temp. 3.5°C, 16 Sept. 1988. - ZMUC P761194-1196 (SL 108-135 mm), "Shinkai Maru" haul 84 (69°42'N, 60°03W), 1322-1334 m, bottom trawl, temp. 3.7°C, 11 Sept. 1990.

Remarks to material

The reason why some of the specimens are not designated paratypes is that *adolfi* is found on both the eastern and western side of Greenland (Fig. 3) and there seems to be a slight difference between the two populations. Consequently, only the specimens caught on the holotype-side of Greenland are considered paratypes.

Diagnosis

L. adolfi differs from all other Atlantic *Lycodes* spp. in the restricted squamation which begins at the midpoint of the fish or further back (the two smallest specimens, SL 80-133 mm, are scaleless) and by the pointed posterior tip of the gill cover. It is moreover distinguished in having the following combination of characters: one lateral line the posterior part of which runs near the anal fin, preanal length less than about 45% SL, 25-30 scale rows between dorsal and anal fins, lack of distinctive colour markings and vertical bars, and depth at anus less than 10% SL (longest specimen 230 mm SL).

Description

Meristic and morphometric characters are given in table I.

Holotype. - Long and slender body with tapering tail. Preanal length 43.5% SL. Head higher than highest part of body. Small, non-overlapping scales on posterior part of body. Distance from snout to anterior scales 58% SL. Anterior border of squamation wedge-shaped. Maximum number of scale-rows 25-30 between dorsal and anal fins. No scales on dorsal, caudal and anal fins. Distinct, pale neuromasts in lateral line, which runs from top of gill opening downwards towards anus and continues just above anal fin, traceable to halfway to caudal tip. Pectoral fins almost reaching anus. Ventral fins short. Head prominent with large eyes and narrow, bony interorbital width (1.2% SL). Single tubular nostril on each side placed close to tip of snout. Very small sensory pores on head. Along upper and lower jaws large, circular depressions which may be a preservation artefact. Lower jaw with well developed mental crest. Gill cover with long, pointed posterior flap. Mouth wide and inferior. Teeth long and pointed. Premaxillary and dentary with uniserial teeth posteriorly and a few irregular rows near symphysis. Vomer with four teeth in a round patch and palatine with 14 teeth in one row. All gill rakers formed as small knobs. Anterior arch with two knobs on epibranchial and nine on cerato- and hypobranchial. Precaudal vertebrae 20, numbers 6-20 with parapophyses of increasing lengths. Stomach and oesophagus thick and muscular. Two short, broad pyloric appendages, a short, thin intestine, a small liver and spent ovaries. Sides of body light brown, fins and head somewhat darker and peritoneum black- brown.

Paratypes. - Only characters in which the paratypes vary from the holotype will be mentioned. For all characters stated in table I the variation among the paratypes includes the holotype, except for the number of rays in the dorsal fin in which it is the highest. In the two smallest paratypes (SL 80-133 mm) scales are not yet developed, a feature known among other *Lycodes* spp. In some specimens part of the normally scaled area along the midline on both sides is scaleless. The posterior flap of the gill cover is not elongate in the smallest specimen. The number of teeth in the vomer is 2-6 and in palatine 8-18.

Additional specimens. - The four specimens from West Greenland differ in certain ways from the East Greenland material: dorsal finrays 90-93 *vs* 94-99 in East Greenland specimens; smallest specimen (SL 108 mm) scaled *vs* East Greenland specimen (SL 133 mm) scaleless. See also biology.

Table I. - Meristic and morphometric characters of *Lycodes adolfi*.

	Holotype	Paratypes						Additional specimens			
	P761186	P761187	P761188	P761189	P761190	P761191	P761192	P761193	P761194	P761195	P761196
Standard length (mm)	215	210	200	133	80	200	230	208	135	108	123
Meristic characters:											
Dorsal finrays	99	97	98	94	-	94	96	93	91	90	91
Anal finrays	79	83	76	82	-	79	81	80	78	77	78
Pectoral finrays	18-18	17-16	18-18	17-17	18-18	19-19	18-18	18-18	19-16	18-18	18-18
Vertebrae (including ural)	20+80	20+84	21+78	20+82	19+81	21+81	20+83	21+81	20+79	19+78	19+79
Ant. dorsal fin pterygiophore behind vertebra no.	6	6	6	7	6	7	7	6	6	6	7
Ant. anal fin pterygiophore behind vertebra no.	21	20	21	20	-	21	21	21	20	20	20
Anal fin origin below dorsal finray no.	15	14	15	14	-	14	17	16	15	14	14
Teeth on vomer	4	6	5	5	2	4	5	4	4	2	3
Teeth on palatines	14	12	14	8	9	18	14	12	9	11	9
Morphometric characters in % of SL:											
Head length	23.0	21.0	21.5	23.5	23.0	24.0	21.0	23.0	23.5	22.5	22.0
Maximum depth of head	9.9	9.7	11.0	11.0	9.4	11.5	9.6	9.9	10.5	8.9	8.4
Depth at anus	7.4	7.6	7.3	9.4	5.3	9.9	8.9	8.2	8.1	7.2	6.5
Snout length	7.0	6.0	6.5	6.8	6.9	7.6	6.4	6.7	7.6	7.2	6.7
Horizontal diameter of pigmented eye	4.0	4.3	3.6	4.9	4.8	4.4	3.7	4.3	4.4	4.3	4.2
Preanal length	43.5	-	44.5	44.5	41.5	44.0	39.0	44.0	41.5	42.0	41.0
Predorsal length	28.5	-	27.5	28.5	28.5	28.0	25.0	27.5	29.5	26.0	27.5
Snout to anterior scales	58	53	58	scaleless	scaleless	55	57	53	49	54	60

Otolith

Figure 2 shows the left sagitta from a paratype. It is subcircular and very thick. Sulcus is undivided and relatively deep ending in a narrow ostial channel. The area is provided with radiating structures.

Ontogenetic changes

The present 11 specimens vary in standard length between 80 and 230 mm. The smaller are juveniles with poorly developed gonads and of the larger specimens there are three spent females giving a series from which ontogenetic change can be observed. Two of the smaller specimens (SL 80 and 133 mm) are completely scaleless while the rest of the specimens have squamation typical for the species. The number of teeth on the vomer and palatines increases with growth, from 2 to 6 in the former and from 8 to 18 in the latter. Smaller specimens have the palatine teeth in one row while, in the larger, the teeth are arranged in two irregular rows anteriorly.

Distribution and biology

The material was caught in bottom trawls at five stations (Fig. 3). The holotype and six paratypes are all from the eastside of Greenland where they were caught at 1283-1380 m of depth and at negative temperatures (-0.2 to -0.3 C°) indicating polar water. The non-type specimens from the west side were taken at depths between 527 and 1334 m, but at positive temperatures (3.5-3.7 C°) suggesting water of Atlantic origin.

Stomach contents with identifiable remains observed in one specimen only (a ca. 15 mm long amphipod of the family Amphilochidae); all other specimens contained unidentifiable crustacean remains.

The gonads showed three spent females with remaining eggs up to 1-2 mm in diameter, two unripe females, one unripe male and five specimens which could not be sexed because they were juveniles or damaged. All specimens were caught in the month of September so the presence of spent specimens indicates that spawning takes place during the summer. This coincides with Andriashev (1986) who for several species of *Lycodes* states "reproduction autumn ".

Affinities

L. adolfi belongs to the short-bodied *Lycodes* spp.- group characterized by a preanal length less than about 45% SL and by having one (ventral) or two (one mediolateral and one ventral) lateral lines (Andriashev 1986: 1136). About 10 North Atlantic spp. are included in this group of which *L. atlanticus* Jensen, 1902, *L. frigidus* Collett, 1878, and *L. vahli* Reinhardt, 1831, like *adolfi*, have a single, ventral lateral line. All three however, are easily distinguished from *adolfi* in their squamation beginning anterior to the dorsal fin in adults and subadults while in similar-sized *adolfi* the squamation begins near the midpoint of the tail. *L. adolfi* has a uniformly coloured body while *vahli* has variegated pigmentation on the body and 1-2 large, black spots anteriorly on the dorsal fin, at least in specimens up to 35 cm in SL. *L. frigidus* has smaller scales than the other spp. with about 50 scale rows between the anus and the dorsal fin. This leaves *L. atlanticus* as the most similar species. Besides the squamation *L. atlanticus* differs from *L. adolfi* in its higher pectoral fin ray counts (20-24 vs. 16-19 in *L. adolfi*) and more precaudal vertebrae (22-24 vs. 19-21 in *L. adolfi*).

Etymology

The species is named after Professor Adolf S. Jensen, specialist in Arctic fishes, who worked at the Zoological Museum, Copenhagen. His numerous publications appeared from 1894 almost to his death in 1953.

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